MASTER OF SCIENCE
IN
APPLIED PHYSICS

EXPERIMENTAL USE OF THE LAWRENCE LIVERMORE DEVELOPED MICRO-POWER SHORT PULSE RADAR TO EXTRACT LOW AMPLITUDE MODULATION SIGNALS CORRESPONDING TO HUMAN HEART RATES

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Detecting a living person buried in rubble or concealed in buildings has far reaching search and rescue as well as military applications. This thesis developed a filter from a catalog of close range impulse response signals that were acquired using Micro-power Short Pulse Radar developed at Lawrence Livermore National Laboratory.

Utilizing matched filtering techniques, low amplitude modulations signals corresponding to the human heart were extracted from return signals out to 40 feet. Human heart signals were extracted from return signals in air and through different materials. The matched filter output of the signal compared with the noise was then used to develop detection probabilities and performance characteristics based on range and material.